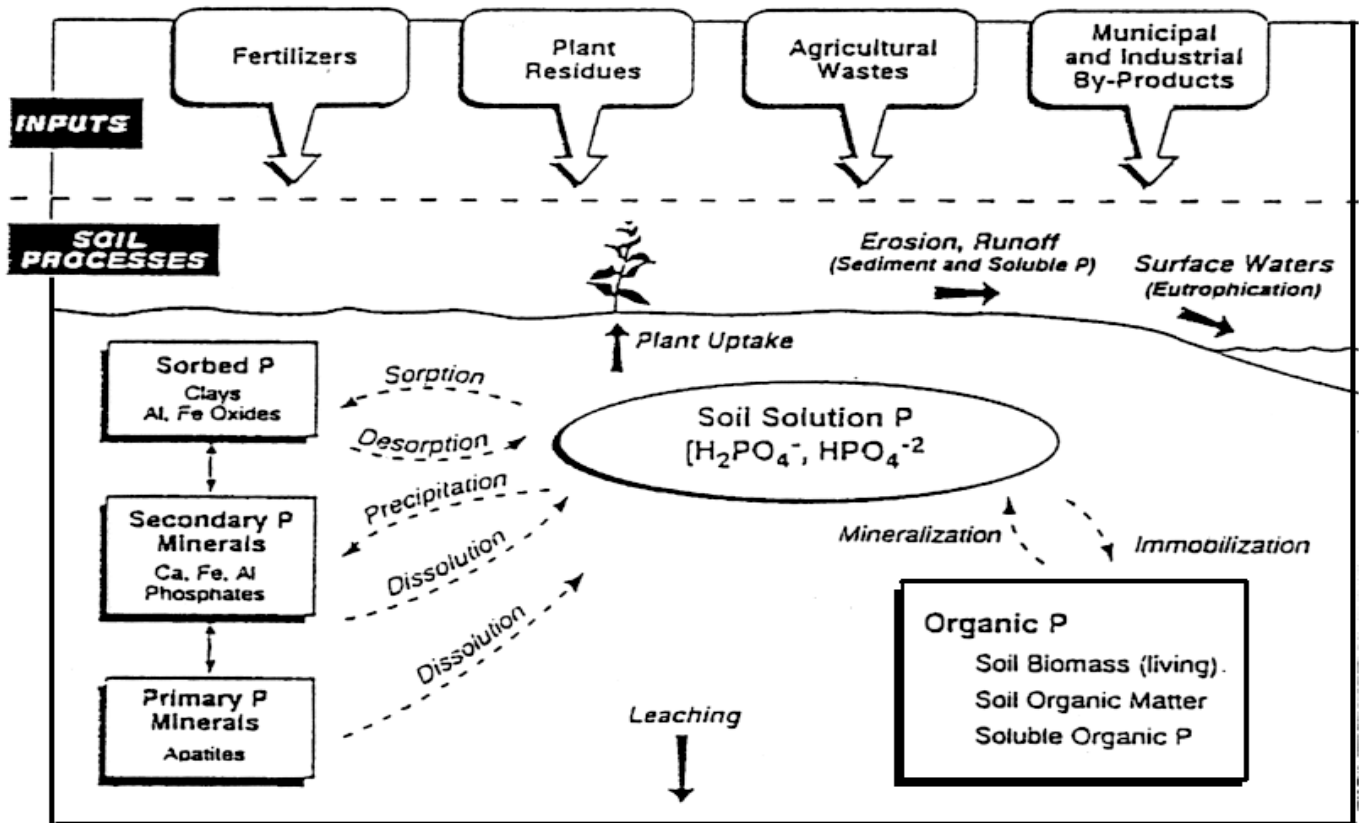


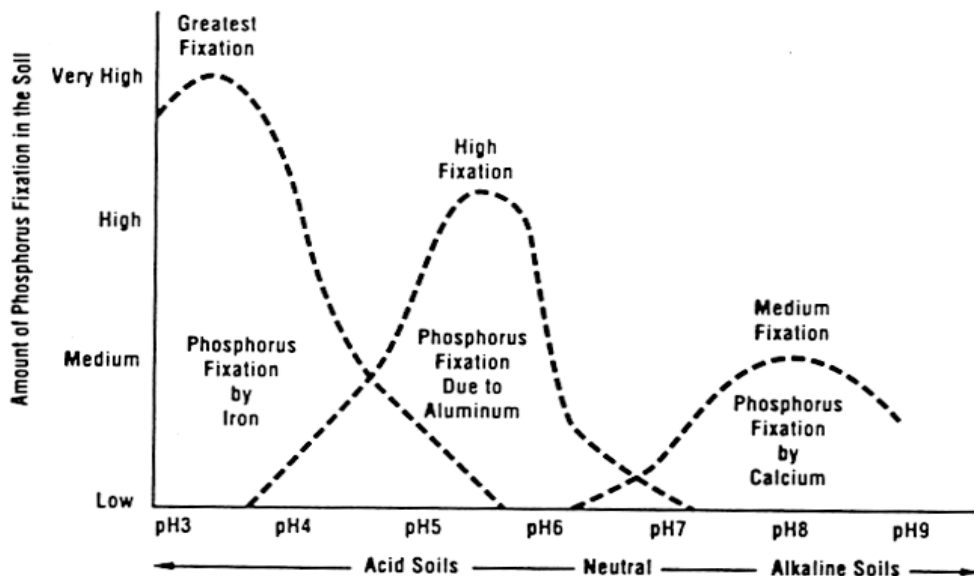
Soil Health - Phosphorus

(P) commonly is one of the most limiting nutrients for crops and forage. The primary role of P in plants is storage and transfer of energy produced by photosynthesis for growth and reproductive processes. Phosphorus cycles in soil through various processes and in various forms. Some forms are readily available for plant use, and some are not.



Soil Phosphorus Cycle (Pierzinski and others, 1994)

Soil pH of 6 to 7.5 is ideal for the availability of P for plant use. Values of less than 5.5 and 7.5 to 8.5 limit availability of P as a result of fixation by aluminum, iron, or calcium, which commonly are associated with soil parent material.



Phosphorus availability across pH ranges (California Fertilizer Association, 1995)

Soil Health - Phosphorus

Measuring Soil Phosphate (PO₄)

Materials needed:

Soil Probe and plastic container
Phosphate Test Strips
1/8 cup (29.5 mL) measuring scoop
Calibrated 120mL vial with lid

Squirt bottle
Distilled water or rainwater
Pen, notebook, permanent marker
Resealable plastic bags

Procedure: Quick In-Field Hand Test

1. Using a soil probe, gather at least 10 small samples to a depth of 8 inches or less randomly from an area that represents a particular soil type and management history. Place samples in the small plastic container and mix. Samples gathered for no-till cropping, forage establishment, and environmental purposes can be taken to a shallower depth. Do not include large stones and plant residue. Repeat this step for each sampling area.
2. Neutralize hands by rubbing moist soil across palms. Discard soil. Place a scoop of the mixed soil in palm of hand and saturate with “clean” water (distilled water or rainwater).
3. Squeeze hand gently until a soil and water slurry forms.
4. Touch tip of phosphate test strip to the soil and water slurry. Leave until the liquid is drawn up at least 1/8 to 3/16 inch beyond the area covered by the soil.
5. After 1 to 2 minutes, compare color of wet test strip to color chart on the test strip container. The color on the chart that most closely matches the color on the test strip indicates the amount of phosphate in the saturated soil.

Procedure: 1:1 Soil to Water Phosphate Test

1. Soil sampling should be completed as instructed in step 1 under “Quick in-field hand test.”
2. Fill scoop (29.5 ml) with the mixed soil, tamping down during filling by carefully striking the scoop on a hard, level surface. Put soil in vial. Add one scoopful (29.5 ml) of water to the vial, resulting in a 1:1 ratio of soil to water, on a volume basis.
3. Tightly cap the vial and shake 25 times. Let settle for 1 minute. Remove cap, and carefully decant 1/16 inch of soil and water slurry into cap.
4. Allow to settle for 2 to 3 minutes. Touch end of phosphate test strip to soil and water slurry. Leave until the liquid is drawn up at least 1/8 to 3/16 inch beyond the area covered by the soil.
5. After 1 to 2 minutes, compare color of wet test strip to color chart on test strip container. The color on the chart that most closely matches the color on the test strip indicates the index value of phosphate in the water-saturated soil.